C.MURALI MADHAV

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SUMMARY

I love using my skills to build things that actually make a difference in people's lives. My goal is to keep exploring, innovating, and contributing to STEM in a way that helps society move forward.

EDUCATION

Bachelor of Technology in Computer Science & Artificial Intelligence Expected Graduation: May 2027
Newton School Of Technology, Rishihood University **CGPA: 3.74/4**

Relevant Coursework: Data Structures and Algorithms, Software Engineering, Operating Systems, Object-Oriented Programming, Database Management, Machine Learning, Applied Linear Algebra, Probability and Statistics, Cybersecurity, Computer Architecture, Artificial Intelligence & Machine Learning, Data Mining, Computer Networks, Advance Machine learning, Operating systems, Advance Discrete Mathematics and Deep Learning.

ACHIEVEMENTS

- **Competitive Achievements**
  - **HackMIT 2026:** Achieved 8th place globally in the HackMIT Puzzle Solver Contest 2026; participated in the Meta and Visa sponsor challenges at MIT, Cambridge, USA in September 2026, shortlisted among 25 of 200 teams in the first round.
  - **IEEE PES Energy Shark Tank 2026 (18th APPEEC, Singapore):** Startup pitch FlexGrid selected among the Top 5 pitches in the IEEE PES Young Professionals Industry Innovation Session; awarded a Certificate of Achievement for the most outstanding innovative solution and placed 3rd on the final leaderboard.
  - **University Topper:** Secured highest academic standing for B. Tech (CS&AI) as of third Year.
  - **Y Combinator Startup School India 2026:** Selected to YC's invite-only founder program in Bangalore.
  - **NST Startup Foundry 2026:** Won 1st place for Jarvis, an AI-powered Personal Intelligence System pitched to Google Cloud and Microsoft for Startups.
  - **Google Big Code:** Top 50 nationally, invited to the 48-hour Challenge Finale; awarded a Google Pixel device.
  - **HackMIT 2025:** Achieved 17th place globally in the HackMIT Puzzle Solver Contest 2025 and runner-up in the Voloridge sponsorship challenge.
  - **Zuvees:** Secured Pre-Placement Offer through exceptional project impact and first-of-its-kind Delivery Slot Management System.
  - **IEEEXtreme 18.0 & 17.0**: Improved from Global 1305 / AIR 446 (17.0, 2023) → Global 775 / AIR 224 (18.0, 2024).
  - **Meta Hacker Cup 2024**: Global rank 4553.
  - **JEE Advanced 2023 & NTSE 2020**: JEE Advanced All-India Rank 5649 & NTSE Scholar.
- **Achieved Second** in the **State Level Public Speaking Contest** organized by the daily newspaper **The Hindu.**
- **Berkeley Global Access (BGA) Program:** Selected for Spring 2026 and Fall 2026 semesters at UC Berkeley, advancing AI and CS studies at a world-leading institution.

EXPERIENCE

Transient AI Inc - New York, USA
Software Development Engineer – Intern (June 2025 –September 2025) | **New York, USA & Remote India**

- Won Best Project at the internal hackathon with a stock-price prediction model built on real-time market-data APIs.
- Optimized pattern-discovery pipelines that separate real signals from noise in market data for live hedge-fund AI products.
- Co-built real-time portfolio-risk dashboards for hedge-fund research, with sentiment analysis and semantic search.

Zuvees – United Arab Emirates (UAE)
Software Development Engineer – Intern (January 2025 – June 2025) | **Dubai, UAE & Bengaluru, INDIA**

- Developed and optimized Warehouse Management System (WMS) and Order Management System (OMS) on the MERN stack with automated order-intake and fulfilment pipelines, boosting Contribution Margin 1 by 60% and conversion rates from 45% to 140%.
- Designed scalable business process workflows for delivery, inventory, and order systems, integrating Shopify APIs, dynamic pricing via price slabs, and real-time slot management, enhancing operational efficiency and customer experience.
- Architected AWS infrastructure (S3, RDS, EC2) and CI/CD pipelines with GitHub Actions and Docker, ensuring high availability and scalability for the Zuvees e-commerce platform.

Zota Health Care Ltd
Front-End Developer-Intern (June 2024 – August 2024) | **Remote**

- Enhanced **inventory management**, improving stock tracking accuracy by **25%** and reducing overstocking by **20%**.
- Implemented **real-time sales tracking**, enabling faster decision-making and better sales analysis.

Publications

C. Murali Madhav, R. Yadav, K. Mehra, A. Tewary, and S. Aggarwal. *"KAT-PatchTST: Physics-Informed Forecasting with Kirchhoff Conservation."* 18th Asia-Pacific Power and Energy Engineering Conference (APPEEC), Singapore, August 2026 (IEEE), pp. 107–112. Published in IEEE Xplore, DOI: 10.1109/APPEEC67771.2026.11749997.

Stage 1 of the **Watt-IF** research project; Stages 2 and 3 under active development, targeting ICML.

Provisional patent filing in preparation.

PROJECTS

Watt-IF – Physics-Informed Power Grid Forecasting (Paper)

- **KAT-PatchTST (Stage 1, first author):** Physics-informed BA-aggregate load forecaster combining **Channel-Independent PatchTST** + **TimeXer cross-attention** with a **Kirchhoff conservation regularizer** and **ReLoBRaLo dynamic loss balancing**. Attains **3.65% demand MAPE** on the six-BA EIA-930 protocol with a 240-hour context and ~3.9M parameters, within 0.78 pp of the best weather-integrated baseline.
- **Follow-up forecaster:** LightGBM with archived weather forecasts **beats US grid operators' own day-ahead forecasts**: 2.50% vs 3.51% MAPE on the paper's six regions, 4.14% vs 7.64% across all 52.
- **Stage 2 (in development, targeting ICML):** Forecast-conditioned operational feasibility analysis on the BA-interchange network — identifying systemic bottlenecks and quantifying node criticality from forecasted grid states.
- **Grid screening:** batched Numba Dinic max-flow solver, **~340x faster than NetworkX** (1.11 ms to 3.3 µs per grid-hour).
- **Stage 3 (in development, targeting ICML):** Learning a conditional grid-partition policy that minimizes allocation failures under forecasted operating conditions.

Unwrap – Shopping Wrapped & Group Gifting for Friends (HackMIT 2026) (GitHub)

- Co-built the backend (Fastify, TypeScript, Supabase) for Unwrap, a private monthly shopping "Wrapped" for friend groups, with a four-person team at MIT; shortlisted among 25 of 200 teams in the first round of the Meta and Visa challenges.
- Computed taste matches between friends with cosine similarity over taste, price-band and weekday vectors; Claude writes the story around the numbers and recommends gifts using embedding search grounded in each recipient's saved items.
- Integrated the Visa Direct API to collect each friend's share of a group gift, running live in the Visa sandbox with message-level encryption, plus a Manifest V3 Chrome extension that saves any product page to a wishlist.

MPI Log Analyzer & CUDA SIEVE (HackMIT 2025 & 2026) (GitHub)

- Cut log-analysis time 70% by parallelizing parsing and anomaly detection across nodes with MPI in C++ (HackMIT 2025).
- SIEVE: cut false discoveries on pure noise from 100% to 4%; rediscovered volatility clustering in 36 years of VIX.
- SIEVE: 112x faster than single-core NumPy with warp-per-rule CUDA kernels; profiling found and cached a 53% host bottleneck.

Monte Carlo Simulation for Stock Portfolio (GitHub)

- Developed a **Monte Carlo simulation** to estimate stock portfolio values, modeling returns with **Cholesky decomposition**.
- Simulated **100 portfolio projections** over **100 days** to assess risk and future performance.

Optiforge Neural Options Pricing (GitHub)

- Developed a neural option pricing system integrating deep sequence architectures with GARCH volatility, benchmarked against Black-Scholes, enabling quantitative comparison between ML based and Analytical pricing.
- Built an Interactive Dashboard with heatmaps, sensitivity analysis (price vs spot, volatility) and Multiple Models Trains with different features to visualize pricing behavior and model errors across market conditions

Image to Audio (Assistive Tech for Visually Impaired) (GitHub)

- Built an **AI-powered Flask app** generating audio descriptions from images using **Salesforce's BLIP image captioning model & SVM for floor classification to enhance environmental awareness** using three feature strategies (RGB-only, RGB+spatial, KMeans regions) on my own dataset.
- Converts uploaded images to speech, creating a practical assistive tool for visually impaired users.

COURSES AND CERTIFICATIONS

Online Courses:

- **Introduction to Discrete Mathematics for Computer Science**
  University of California, San Diego (Coursera)
- **Exploratory Data Analysis for Machine Learning**
  International Business Machines Corporation (IBM)
- **Supervised Machine Learning: Regression & Classification**
  International Business Machines Corporation (IBM)
- **Unsupervised Machine Learning, Deep Learning and Reinforcement Learning**
  International Business Machines Corporation (IBM)
- **Mathematics for Machine Learning**
  Imperial College London

- **Financial Markets**
  Yale
- **Pricing Options with Mathematical Models**
  Caltech
- **Connect and Protect: Networks and Network Security**
  Google
- **Foundations of Cybersecurity, Ethical Hacking, Networks and Network Security**
  Google

- **Introduction to Statistics**
  Stanford University
- **Deep Learning Specialization**
  DeepLearning.AI

Workshops and Summer Schools:

- **CeNSE Summer School on Semiconductor Technology and Microfabrication**
  Centre for Nano Science and Engineering, Indian Institute of Science, Bengaluru

TECHNICAL SKILLS

- **Programming Languages:** C++, Java, Python, HTML5/CSS, JavaScript, TypeScript
- **Web Technologies:** Next.js, Amazon Web Services (AWS), MERN, NPM, Webpack
- **Machine Learning Technologies:** PyTorch, NumPy, TensorFlow, Pandas, LightGBM, Matplotlib, Flask
- **Parallel & GPU Computing:** CUDA, MPI, Numba
- **Tools/Databases:** Jira, Git, Docker, GitHub Actions, MySQL, PostgreSQL, MongoDB

LEADERSHIP AND INVOLVEMENT

- Lead | ICPC Club – (1st & 2nd Year)
- Team Lead | Community Development
- Cofounder & Volunteer | More Than Me
- Member | IEEE
- Associate | Cultural and Technical Festival